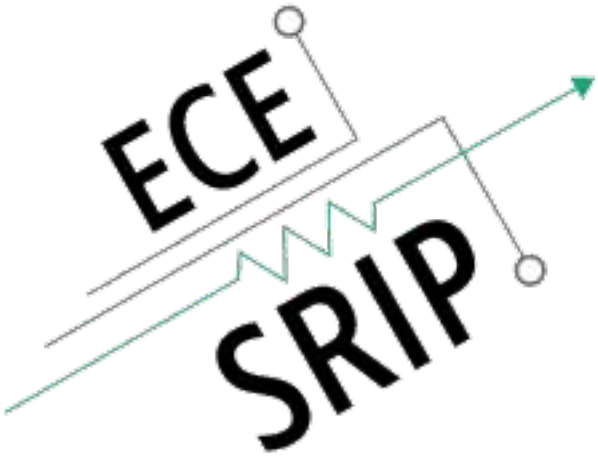


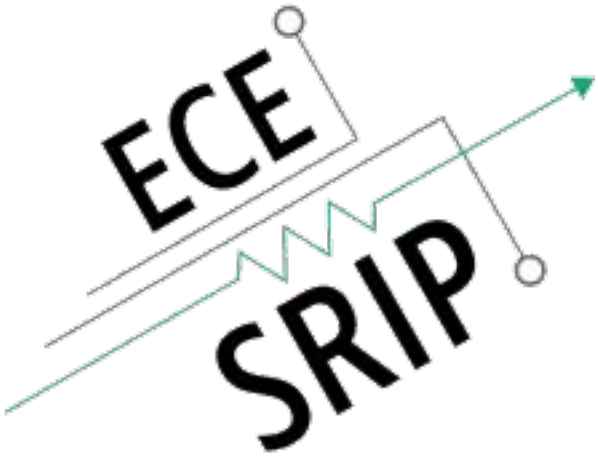
FACULTY MENTOR
Chris Mi

PROJECT TITLE
Modeling of an extremely high power charging system for all electric airplanes.

PROJECT DESCRIPTION
Description: In past decades, the world has pushed the transition from a conventional gas system toward the electric system. With the success of electric vehicles, people move their attention to electric aircraft. One of the most essential parts of all-electric aircraft is the charging system for the energy storage unit, such as batteries and supercapacitors. However, current charging systems are insufficient to charge the aircraft quickly. For example, the power rating for current charging systems are tens kilowatt. Nevertheless, the power required for a single-aisle aircraft may be up to a few megawatts, which needs hours and hours to charge the aircraft completely. Hence, it's impossible to adopt the current charging system in all-electric aircraft. Therefore, it's indispensable to develop a high-power charging system for aircraft that charges aircraft within a short time. In this project, the student will investigate the state-of-art charging system and develop an innovative high-power charging system model. The system investigation will include AC/DC and DC/DC converters for wired and wireless power transfer. Finally, the model will be verified with the help of simulation.

INTERNS NEEDED
1 BS or MS

PREREQUISITES
Required Qualifications:
1. Familiar with Matlab/Simulink
2. Has taken some courses in electronics



FACULTY MENTOR
Chris Mi

PROJECT TITLE
Modeling of the power systems of an all-electric passenger airplane

PROJECT DESCRIPTION
Description: Recently, with the concern of saving energy and reducing greenhouse gas emissions, the aviation industries shift their aim toward more/all-electric aircraft (MEA/AEA). Instead of using gasoline as fuel for aircraft, the electric energy source, such as batteries, supercapacitors are used as a source for MEA/AEA to replace traditional engines. Moreover, the hydraulic and pneumatic systems in the traditional system will also be replaced by the electric systems. As electric aircraft power systems grow in complexity and power rating, the design, evaluation, and testing of such systems become quite challenging tasks. Therefore, a novel electric system is inevitably necessary to deal with grow of power system, typically few MW to tens of MW power levels. In this project, the student will focus on the basic needs for the single-aisle MEA/AEA including the power conversion units, energy storage units, propulsion system as well as power distribution. Then, the power characteristics are simulated under typical flight status and energy optimization will also be analyzed. Finally, a comprehensive electric system model will be developed and verified with the help of simulation.

INTERNS NEEDED
1 BS or MS

PREREQUISITES
1. Familiar with Simulink and courses in electronics